Center Innovation Fund: SSC CIF

Novel Data Acquisition and controls System (DACS) Demonstration

Completed Technology Project (2014 - 2016)

Project Introduction

The combined data acquisition and controls architecture is eliminating the need of the widely popular programmable logic control (PLCs). The system uses either Peripheral Component Interconnect (PCI) or PCI eXtension for Instrumentation (PXI) buffered controls cards for analog and digital outputs (ADO) in a chassis with a General Purpose Interface Bus (GPIB) interface. The GPIB will connect to a commercially available off the shelf ADO. The control cards will output a timing sequence similar to that of a PLC (similar voltage and current levels) however the sequence data will be preloaded on a buffer prior to test. The buffer will then be stepped through when the sequence begins. The loop rate of a PLC can be surpassed by performing a buffered output so a finer resolution of controls' activities can be achieved. Additionally one piece of LabView™ code will be required for this project to replace a mix of Wonder Ware®, LabView™, and Microsoft® Excel.

Anticipated Benefits

The novel data acquisition and controls system would benefit NASA funded missions because this tool does not rely on PLC thus improving the control loop rate speed. This smaller, stand alone, data acquisition and control system could be used on small scale projects, where complex acquisition and control systems can be independent of a main test complex DACS. It' s availability would reduce the potential for operator error when conducting test where data is being collected and monitoring is occurring and consolidated on only 1 screen, rather than the typical and often conflicting read-outs that are traditionally displayed on 2 different screen.

Benefits to NASA unfunded missions and planned missions, anticipated as part of future test programs, could potentially be that the size of control rooms and data storage could be reduced by half. Additional software maintenance could also be reduced by having to only use piece of LabView® code instead of the three that have historically been used (WonderWare®, LabView™, and Microsoft® Excel).

Benefits to the commercial space industry would be similar to those that would provide to NASA. Any processes that require and incorporate multiple data and acquisition control systems would benefit by this simplified, and user information is potentially more accurate. Additionally, the potential for significant costs savings could be a benefit as well.

Benefits to other government agencies would be similar to those provided to NASA. If proven successful, a deployable DACS architecture with documented results on performance would be available for use, which would simplify processes, increase user confidence, and reduce costs.

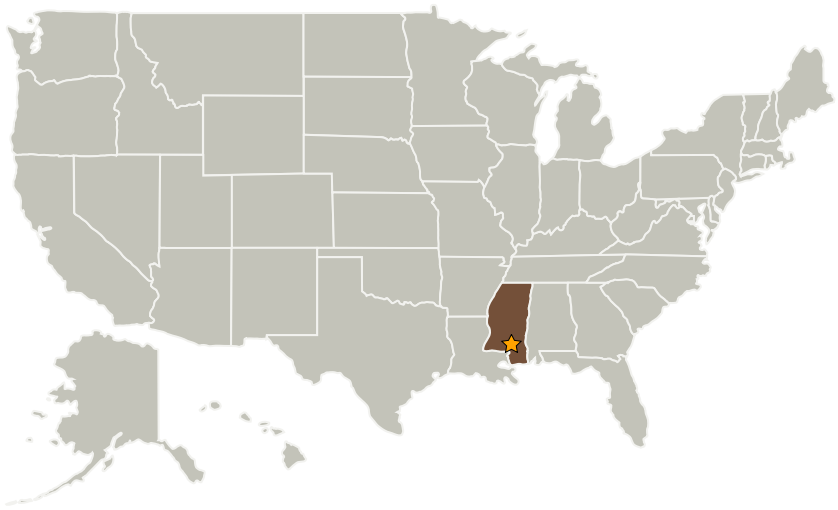
Logo for the Office of Chief Technologist

Table of Contents

Novel Data Acquisition and controls System (DACS) Demonstration

Completed Technology Project (2014 - 2016)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations
Mississippi

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Center Innovation Fund: SSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Ramona E Travis

Project Manager:

Nicholas J Nugent

Principal Investigator:

Nicholas J Nugent

Novel Data Acquisition and controls System (DACS) Demonstration

Completed Technology Project (2014 - 2016)

Images

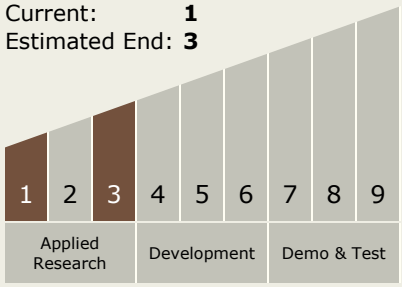
Office of Chief Technologist
Logo for the Office of Chief Technologist
(https://techport.nasa.gov/image/4040)

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Technology Maturity (TRL)

Start: **1**
Current: **1**
Estimated End: **3**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.4 Information Processing
    - TX11.4.2 Intelligent Data Understanding